

CodeSurfer Source Code Analysis Tool

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What it is: *CodeSurfer* is a source-code browser that understands pointers, indirect function calls, macros, and whole-program effects. *CodeSurfer for C/C++* is a commercial tool that is available from GrammaTech, Inc.

Features: CodeSurfer offers searching, impact analysis (through program slicing and chopping), and navigation features. CodeSurfer provides detailed program information. For example, you can select a use of a variable in a particular statement and click a button to see all the assignments to that variable that can affect its value. Assignments that cannot reach the selected statement are automatically filtered out of the results, saving you time. A more complete list of features is available at <http://www.grammatech.com/products/codesurfer/overview.html>

Benefits: CodeSurfer makes it easy to understand and analyze code.

Successes: CodeSurfer has been used successfully at many organizations, including the following: NASA JSC, Airbus, Thales, and Siemens. Mark Markovich at NASA JSC reports on his team's experience with CodeSurfer: *"Our group analyzes many mission-critical software projects to reduce defects and ensure that the software meets requirements. We conducted a formal study, sponsored by the NASA Research Infusion group, to see if CodeSurfer could improve our software inspections. In parallel to our normal inspection process, an independent team used CodeSurfer. We found that CodeSurfer reduced inspection time by an average of 40%. In addition, when using CodeSurfer the number of defects found increased by an average 116%."*

Contexts in which it is best used: CodeSurfer works best on projects where most of the code is written in C/C++. The tool has been tested with code written for many popular C/C++ compilers (e.g., GNU/gcc and the Microsoft compilers). The most detailed analyses are available if the program being examined is 200,000 lines of code or smaller, although many users have used CodeSurfer on larger projects. Setting up CodeSurfer to work with your project is similar to setting up a compiler, and CodeSurfer can use most makefiles. CodeSurfer can be used by programmers during implementation, by inspection teams to facilitate the inspection process, and during V&V to identify coding issues.

Compare with alternative known products or technologies. Two distinguishing characteristics of CodeSurfer are detailed impact analysis and pointer analysis. While there are other tools available that support code navigation, only CodeSurfer allows you to determine how a statement (or set of statements) impacts the rest of the program by using forward program slicing. You can also slice backward—you can select a statement and immediately see all the statements in the program that affect the values of the variables in the selected statement. Pointer analysis shows what pointers can point to. CodeSurfer also resolves indirect function calls so the call graph is complete.

What will a collaboration look like?: GrammaTech will work with you during proposal development on planning the collaboration. Prior to the collaboration, you should communicate with us to determine whether your application is a good fit for CodeSurfer. At that time, we should jointly determine what metrics would make sense to collect. At the start of the collaboration, we suggest a 2-day formal training course at your site, based on our training materials but tailored to your needs. Alternatively, we can do some training over the web (using WebEx). A tutorial is available, as well. We will help you set up CodeSurfer on your project. During the collaboration we

will provide you with unlimited customer support via telephone and email (as we do for all our customers).